# *Science and STEM*

## *Professional Development*
## *Summer/Fall 2015*

### June 2015

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|---|---|---|
| STEM Boot Camp | 6/2-3 | $50 |
| Webinar: Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades K-2) | 6/8 | Free |
| Webinar: Infographics in STEM | 6/10 | Free |
| Webinar: Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades 3-5) | 6/15 | Free |
| Webinar: STEM in the Primary Classroom | 6/16 | Free |
| Webinar: Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades 6-8) | 6/22 | Free |
| Webinar: STEM Learning Using the 5Es Instructional Model | 6/24 | Free |

### July 2015

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| STEM Boot Camp | 7/6-7 | $50 |
| Webinar: Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades K-2) | 7/7 | Free |
| Webinar: Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades 3-5) | 7/14 | Free |
| Webinar: Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades 6-8) | 7/21 | Free |
| Webinar: Developing STEM Literacy through the Practices | 7/22 | Free |

### August 2015

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| Webinar: Effective Discourse Communities in the STEM Classroom Using the Practices | 8/5 | Free |
| Webinar: “E”ngineering in the STEM Classroom | 8/11 | Free |
| Webinar: Reading & Writing in the STEM Classroom | 8/20 | Free |
| Constructing Explanations in Science, Grades 5-8 | 8/20 | $50 |
| Effective Discourse Guided by the Math and Science Practices | 8/25 | $50 |

### September 2015

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| What Are My Science Students Thinking? (Grades K-8) | 9/16 | $50 |
| Making Sense of Science – 5-day Energy Course for Teachers | 9/24-26<br>10/9-10 | $200 |

***All face-to-face courses are held 8:30 – 4:00*** *unless otherwise noted during registration.*

***Audience*** : Science and STEM teachers, district professional development trainers, coaches, regional representatives, content teachers.

Click links for more information and to register. Descriptions of each course and webinar are listed below.
*Courses subject to cancellation due to low enrollment*

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**Descriptions of Face to Face courses**

### STEM Boot Camp

STEM (science, technology, engineering, mathematics) should not be viewed as curriculum, but rather a way of organizing, integrating, and delivering instruction through an intentional interdisciplinary mindset. There is an increasing need to better understand STEM and provide for more rigorous, relevant and engaging interdisciplinary STEM teaching and learning opportunities. This 2-day 'boot camp' will energize and motivate teachers by building background, providing tools and resources with support to successfully implement integrated STEM connections.

Through this engaging, hands-on 2-day STEM Boot Camp participants will:
- Develop a foundation for understanding the interdisciplinary nature of STEM teaching and learning
- Build their own STEM teaching toolkit based on research and best practices
- Create a framework to develop and sustain a STEM learning environment

Participants will receive the book, ***STEM Lesson Essentials - Integrating Science, Technology, Engineering and Mathematics,*** by authors JoAnne Vasquez, Michael Comer, and Cary Sneider.

**PARTICIPANTS MUST BRING THEIR OWN DEVICE:** For the best experience please bring your laptop with the most current version of Chrome, Firefox or Safari. In addition, please make sure you are able to connect to public/secure Wifi hotspots, it also helpful to have enough administrative rights to be able to download, install or update Internet browsers, Java, or other updates.

### Constructing Explanations in Science, Grades 5-8

Learn to successfully incorporate scientific explanation in your classroom using a variety of strategies, rubrics, and guidelines for designing assessment items. You will break down the complex practice of scientific explanation into claims, evidence, and reasoning, and view examples of what the science practice explanation looks like when it is successfully implemented in the classroom.

Participants will receive a copy of the book, ***Supporting Grade 5-8 Students in Constructing Explanations in Science*** by Katherine McNeill and Joseph Krajcik.

Outcomes for the day include:
- Learn a framework to construct scientific explanations
- Learn to incorporate scientific explanation into your curriculum materials
- Learn to use information from assessment tasks to inform your instruction.

### Effective Discourse Guided by the Math and Science Practices

Have you ever wondered how to get your students to think like a mathematician or ask questions like a scientist? This professional development opportunity will help teachers set up a classroom environment that encourages students to talk, read and write ***or argue*** to improve their understanding in science and math. Connections using The Practices are the foundation for effective classroom discourse.

Outcomes for the day include:
- Make connections between The Math and Science Practices
- Determine how to make use of literacy techniques to increase student understanding in math and science
- Build understanding of high quality tasks
- Build understanding of high quality engagement techniques in discourse

Participants will receive the book, ***Success in Science through Dialogue, Reading and Writing,*** by Arthur Beauchamp and Judi Kusnick

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### What Are My Science Students Thinking? (Grades K-8)

What science ideas do your students bring to your classroom? What prior ideas do they retain even after instruction? This session will explore ways that formative assessment practices help inform teaching and learning in the science classroom. Participants will practice using science probes, formative assessment classroom techniques, and the Making Sense of Student Work Protocol, which can be used in PLCs or with teams of teachers to inform classroom teaching and student learning.

Participants will receive a copy of the book, ***Science Formative Assessment, 75 Practical Strategies for Linking Assessment, Instruction, and Learning*** by Page Keeley.

**Outcomes for the Day:**

- Learn different formative assessment strategies that can be used to inform your teaching and students' learning
- Practice different strategies to assess student understanding of science concepts.
- Practice using the Making Sense of Student Work protocol.

### Making Sense of Science – 5-day Energy Course for Teachers

Developed by WestEd, this comprehensive professional development course for science teachers provides all the necessary scaffolds for building a scientific way of thinking in teachers and students, focusing on science content, inquiry, and literacy. This 5-day course will be split across 2 weeks.

This course is about making sense of the science of energy. It focuses on science, questioning, and literacy — all in the service of building a scientific way of thinking and instilling that way of thinking in students. Through the course activities, you'll learn practical, relevant strategies for teaching science — how to guide hands-on science learning, support evidence-based discussions, and help your students develop the academic language, habits of mind, and communication skills necessary for sense making and scientific reasoning. As a way to investigate teaching, you'll read and discuss cases written by teachers for teachers. The cases, which include rich examples of student work, allow you to grapple with science content, navigate typical teaching challenges, and experience authentic dilemmas that occur when teaching energy to students. Although this course is designed for middle-school science teachers, it is open to all grade levels of science teachers interested in further developing their own conceptual understanding of energy and how their students learn about energy.

**September 24-26**

- Day 1 seeks to answer 'What is energy?' and explores the various kinds of energy that keep our world going.
- Day 2 identifies the various types of potential energy and helps to clarify what it really means to have potential energy.
- Day 3 explores the various ways in which heat energy is misunderstood and the ways in which scientists define and talk about heat energy, how it's transferred, and how it affects our world.

**October 9-10**

- Day 4 provides a systematic explanation for how and why conservation of energy is possible.
- Day 5 explores the complex interactions between food and organisms.

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**Descriptions of Webinars**

### Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades K-2)

How can you align to Arizona's Science Standard, yet teach to the 3-dimensions (practices, crosscutting concepts, and core ideas) of the Framework for K-12 Science Education? This webinar will focus on identifying the learning progressions within Arizona's science standard (grades K-2) and bundling them together to build three dimensional learning as envisioned by the Framework.

### Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades 3-5)

How can you align to Arizona's Science Standard, yet teach to the 3-dimensions (practices, crosscutting concepts, and core ideas) of the Framework for K-12 Science Education? This webinar will focus on identifying the learning progressions within Arizona's science standard (grades 3-5) and bundling them together to build three dimensional learning as envisioned by the Framework.

### Bridging the Gap between the AZ Science Standard and the Framework for K-12 Science Education (Grades 6-8)

How can you align to Arizona's Science Standard, yet teach to the 3-dimensions (practices, crosscutting concepts, and core ideas) of the Framework for K-12 Science Education? This webinar will focus on identifying the learning progressions within Arizona's science standard (grades 6-8) and bundling them together to build three dimensional learning as envisioned by the Framework.

### Infographics in STEM

In order for students to be educated consumers and citizens, they need to understand and be able to think critically about information presented in visual graphical forms. These types of visual representations of information are designed to allow complex and difficult ideas and large amounts of data to be easily understood. Information graphics or Infographics are a graphic visual representation of information and are a visually stunning way to deliver facts and statistics to readers.
The goal of this Webinar is to describe models for integrating infographics through an interdisciplinary STEM teaching and learning and to share with participants some basics for creating infographics in the classroom.

### STEM Learning Using the 5Es Instructional Model

STEM teaching and learning that is structured by Engaging students so they are able to Explore, Explain, Elaborate, and Evaluate their progress provides relevant ways to help them make the interdisciplinary connections needed for conceptual understanding of each of the disciplines. In this 1-hour webinar participants, grades K-12, will explore how embedding the research-based, 5E Instructional Model into STEM classrooms can help establish coherence for lessons within an instructional sequence.

### Effective Discourse Communities in the STEM Classroom Using the Practices

Teaching students how to participate in productive science talk in the classroom is a key way to help them learn about and enact the Science & Engineering Practices, as well as the Mathematical Practices. In this webinar, teachers grades k-12, will hear how research supports teaching students to participate in effective discourse communities in their STEM learning and explore useful tips to begin or strengthen the process in their own classroom.

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**Recorded Webinars**

Webinars are conducted through GoTo Training sessions. To view the recorded Webinars, you may need to install the GoTo Meeting Codec at no charge.

**Please note:** The ADE provides PD hours/certificates for participating in live webinars; no PD certificates will be issued for viewing recorded webinars.

**STEM**

- Developing Authentic Science Fair Research and Projects (HS) (recorded November 25, 2014)
- Developing Authentic Science Fair Research and Projects (Grades 5-8) (recorded October 30, 2014)
- Integrating STEM Learning (recorded October 22, 2014)

**Science**

- Argument in the 6-12 Science Classroom (recorded January 22, 2015)
- Making Sense of ILLPs and Science (recorded October 1, 2014)
- Close Reading of Science Text (recorded March 25, 2014)

**Nature of Science Webinar Series**

- What is Science? Part 1 of a 3-part series (recorded January 15, 2015)
- The Nature of the Scientific Community Part 2 of 3-part series (recorded February 11, 2015)
- Developing Scientific Habits of Mind Part 3 of 3-part series on Nature of Science (recorded April 28, 2015)